The Medicina Station Status Report

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Abstract

General information about the Medicina Radio Astronomy Station, the 32 m antenna status and the staff in charge for VLBI observations, are provided. In 2006 the data from geodetic VLBI observations were acquired using the Mark 5A recording system with good results. Updates of the hardware have been performed and are briefly described.

1. The Medicina 32 m Antenna. General Information

The Medicina 32 m antenna is located at the Medicina Radio Astronomy Station. The Station is run by the Istituto di Radioastronomia and is located about 33 km east of Bologna. The Consiglio Nazionale delle Ricerche (CNR) was the funding agency of the Istituto di Radioastronomia till the end of 2004. Since January 1st, 2005 the funding agency is the Istituto Nazionale di Astrofisica (INAF).

The antenna, inaugurated in 1983, regularly takes part in IVS observations since 1985 and is an element of the European VLBI network. A permanent GPS station, which is part of the IGS network, is installed in the vicinity. Another GPS system is installed close to the VLBI telescope (MSEL) and is part of the EUREF network.

2. Antenna Description

The Medicina antenna has Cassegrain optics, consisting of a primary mirror of 32 m in diameter, and a secondary mirror, called subreflector, of convex shape and about 3 m in diameter. The subreflector, mounted on a quadrupode, is placed opposite the primary mirror, and focuses the radio waves at its centre, where the receiver system is located. For some observing frequencies, a simplified optical system is enough. The subreflector is therefore shifted from its normal position, and the receiving system is placed at the primary focus: this is the case of the S/X observations. The antenna can operate in the range between 327 MHz and 22 GHz.

The receivers are cooled with cryogenic techniques to improve the system sensitivity. The antenna is flexible in changing the operative receiver: only few minutes are needed to change the observing frequency. A recent picture of the antenna is shown in Figure 1.

3. The Staff

Many scientists and technicians are taking care of the observations. However, there is a limited number of people that is dedicated to maintain and improve the reliability of the antenna during the observations: Alessandro Orfei is the Chief Engineer, expert in micro-wave receivers; Giuseppe Maccaferri is the Technician in charge of the telescope's backend; Andrea Orlati is the Software Engineer who takes care of the observing schedules and regularly implements SKED&DRUDG and the Field System.

Figure 1. View of the Medicina 32 m dish taken during geodetic VLBI observations. Note that the subreflector is shifted to allow the use of the S/X receiver located in the primary focus of the radio telescope.

4. Current Status and Activities

During 2006 the Field System version 9.9.0 was installed. The Mark 5A recording system works fine. Almost all observations are made by using hard disks. New disk frames for a storage capacity of 22.5 TB are available for geodetic observations.

4.1. Optic Fiber Link

The Institute of Radioastronomy, the Emilia-Romagna Regional Government and GARR (Italian Academic and Research Network) have signed an agreement under which the Regional Government provides a fiber optical link at 1 Gb/s between the Medicina Station and the GARR backbone in Bologna. The connection is now available. In 2006 Medicina participated to many e-VLBI tests and experiments. At the moment, the whole link is not supporting the maximum rate, mainly due to the long connection to Bologna. EVN will perform many tests to routinely transfer observations using this data link. When a direct connection Bologna-Medicina will be available much more than 256Mb/s will be reliably supported.

5. Geodetic VLBI Observations

During 2006, the Medicina 32 m dish took part in 24 geodetic VLBI sessions, namely 1 IVS-T2, 13 IVS-R4 and 6 EUROPE, 3 VLBA and 1 R&D experiments.